

covered with screw pine (*Pandanus*), &c. From this swamp springs a narrow sandy neck of land extending northward to the river's mouth, and so lying as to inclose a peaceful little lake in front of our garden. A few fishing huts are erected on this tongue of land, and from morning to night it presents a constant succession of animated and amusing pictures. Here in the early morning, before sunrise, the inhabitants of the huts assemble to take their morning bath in the river. Then the horses and oxen have their turn, and are brought down to water. Busy washers are at their work all day, beating the clothes with flat stones, and spreading them on the shore to dry. Fishing boats go up and down continually; and in the evening, when they have been drawn up to land, and the great square sails have been spread to dry, the lagoon, with its long row of motionless sails, looks wonderfully picturesque, especially when the evening breeze swells the sails, and the sun, sinking into the sea, floods the whole shore with a radiance of gold, orange, and purple. . . . The garden of Whist Bungalow has been converted, by the care and taste of its proprietor, into a veritable earthly paradise, containing examples of almost every native plant of importance, and thus forming a valuable botanical collection, as well as a fragrant and delightful pleasure garden. On the very first morning of my stay, as I wandered in rapturous delight under the shade of palms and fig trees, bananas and acacias, I gained a very comprehensive idea of the flora of the plains. Here the noble palm, in all its variety of foliage and fruit, rears its stately columns; cocoa and talipat, areca and borassus, caryota and palmyra; here the banana spreads its great feathery leaves to the wind, and displays its clusters of precious golden fruit. As well as various kinds of the common banana (*Musa sapientum*), a fine example of the Traveller's tree of Madagascar may here be seen (*Urania speciosa*). It stands just at the division of the principal walk, from which the path to the right leads to the bungalow, and that to the left brings us to a magnificent specimen of the banyan or sacred fig tree (*Ficus bengalensis*), forming, with its hanging air-roots and numerous stems, a very striking object; beautiful Gothic arches open out among the roots which, pillar-wise, support the main structure of the tree. Other trees of various groups (terminalia, laurels, myrtles, iron-wood trees, bread-fruit, &c.) are over-grown and intertwined with those lovely creeping and climbing plants which play so important a part in the flora of Ceylon. These belong to the most varied families, for in the dense forests of this magic island, and under the favourable influences of moisture and warmth, a countless multitude of climbing plants strive and cling, and grasp their way upward to the light and air.

"Among the charms of this most lovely garden must be included the large-leaved Calla plants or Aroideæ, and the graceful feathery ferns, two groups of plants, which, both by their individual mass and by the beauty and size of their development, occupy an important place in the lower flora of Ceylon. Scattered among them are many of the finest shrubs and flowering plants of the tropics, partly indigenous, partly introduced from other tropical regions, especially from South America, but all perfectly at home here. Among these rises the stately Hibiscus, with great yellow or red flowers, the flame tree or acacia, a mass of splendid flame-coloured clusters (*Casalpinia*); venerable tamarinds with their aromatic blossoms; while from every branch hang clinging convolvuli with gigantic bell-shaped flowers, and aristolochias, yellow and brown. Rubiaceous plants, such as lilies, orchids, &c., bear extraordinarily large and beautiful blossoms. . . . The animal life inhabiting this garden of Eden does not altogether correspond in variety and abundance with its vegetable world; this is especially the case with its larger and more striking forms. In this respect, as far as I have been able to ascertain, the island is inferior to the

Indian mainland and to Sunda Island, and still more so to tropical Africa and Brazil. I must confess that my first impression was one of disappointment, which rather increased than diminished as I came to know the fauna more intimately, even in the wilder parts of the island. I had expected to find the trees and bushes thronged with apes and parrots, and the flowering plants with butterflies and winged insects of curious form and brilliant hue. But my expectations were doomed to remain unfulfilled, and my only consolation was that other zoologists visiting the island had been equally disappointed. Nevertheless, careful search reveals much that is curious and interesting, even to the zoologist, and in its main features the fauna of Ceylon, though not so rich and brilliant, is quite as singular and characteristic as its flora.

"The vertebrate animals which first claimed my attention in Whist Bungalow and the immediate neighbourhood of Colombo, were numerous reptiles of brilliant colours and curious forms, especially snakes and grasshoppers, and pretty little tree frogs (*Ixalus*), whose weird, bell-like note, resounded in the evenings. The birds chiefly visiting the gardens are starlings and crows, water-wagtails and bee-catchers, and above all the pretty little honey-sucker (*Nectarinia*), which here takes the place of the humming-bird; kingfishers and herons abound on the river banks. Among mammalia the most frequently occurring is the pretty little squirrel that leaps about among the trees and shrubs, and is very tame and confiding; its colour is a brown grey, with three white stripes lengthwise down its back (*Sciurus tristriatus*). Among the insects, dense swarms of which abound everywhere, the first to be named are ants (from the minutest to the most gigantic sizes) including the destructive termites or white ant; wasps and bees among the hymenoptera, and gnats and flies among the diptera are also very abundant. The larger and finer forms of insect life, such as chafers, butterflies, &c., do not exist in any proportion to the flora of the island. Orthoptera (grasshoppers, crickets, &c.), on the other hand, are very varied and curious in form. I will content myself at present with this cursory mention of a subject to which I hope later to return.

"Of articulate animals the spiders (*Arachnidæ*) form a very interesting and curious class, from the minutest mites and ticks upwards to the bird-spinners and scorpions. The closely-allied Millipeds or Myriapodæ are very numerous and of colossal size, sometimes as much as a foot long. I saw one famous specimen on my first morning in the garden of Whist Bungalow, but I was too lost in admiration of the glories of the vegetable kingdom round me to have time for a nearer examination of the animal world."

In this first intoxication of delight which accompanies the realisation of a life-long dream, we must for the present leave Prof. Haeckel, hoping in a future number to give some further account of his observations on the fauna and flora of Ceylon.

NOTES

WE hear that Princeton College, New Jersey, is going to despatch a second scientific expedition this summer to the "bad lands" of Dakotah and Nebraska in search of fossils. It will be under the charge of Mr. W. B. Scott, of the "E. M." Geological Museum of Princeton, who is known to many readers of NATURE on this side of the Atlantic by his papers on the development of *Petromyzon*, &c. A former expedition of a similar kind, undertaken in 1877 under the same auspices, and composed of Messrs. Scott, H. F. Osborn, and F. Speir, jun., succeeded in making a valuable collection of vertebrate remains, which have been fully described in the "Palæontological Report of the Princeton Scientific Expedition of 1877" (Princeton, 1878), and now adorn the geological museum there.

AN interesting telephonic experiment was tried on Tuesday at Malta, during the bombardment of the Forts at Alexandria. A telephone was attached at Malta to the Alexandria cable, and connection was made with the other end of the cable on board the *Chiltern*, off Alexandria. It was found that, owing either to the distance, or to the vibration caused by the firing, it was impracticable to send a verbal message, but the firing at Alexandria was distinctly heard, through the telephone, at Malta—a distance of more than a thousand miles.

A VISIT was paid on Tuesday to the School of Military Engineering and the Royal Engineer establishment at Chatham by the members of the Society of Telegraph Engineers and Electricians. Over 500 of the members, associates, and friends of the society accepted the invitation of the president, Col. Webber, R.E., and were entertained by him at luncheon at the Royal Engineers officers' mess. The guests were shown over the schools, following a programme arranged by the Acting Commandant, and conducted by the officers of the Royal Engineers, who were indefatigable in providing for the entertainment of all. A lecture on torpedo warfare was delivered in the theatre by Major Armstrong, R.E., and the guests visited amongst other sights in the Royal Engineer Institution the schools of electricity, photography, chemistry, architecture, and surveying. Outside, the Engineers' Field Park, the mechanical workshops, the construction of military bridges, use of brushwood for military purposes, siege batteries, earthworks, demolition of railways and stockades, also submarine mine explosions, afforded a most interesting programme, especially so at a moment when all these appliances may be at any moment brought into practical use.

THE Rector of a small parish in Warwickshire is endeavouring to protect and preserve a fine granite boulder, identified as having been floated from Mount Sorrel in Leicestershire, a distance of sixty miles, and now exposed to danger of destruction. To rail it in and record its history by a permanent inscription will cost about 12*l.* The parish is a poor one, and the Rector crippled by an unlet glebe; but 5*l.* has been promised in the village, and 1*l.* has been given by the Boulder Committee of the British Association through its Secretary, Rev. H. W. Crosskey, who has seen the boulder, and will vouch for its scientific interest and value. If any reader of NATURE is good enough to send a small contribution towards the 6*l.* still wanted, to the address of "Rector—care of Editor of NATURE," it will be acknowledged in these columns.

WE regret to announce the sudden death of M. Antoine Breguet, at the early age of thirty years. He was the son of M. Breguet, the member of the Institute, one of the directors of the International Exhibition of Electricity in Paris, and had had for two years the editorship of the *Revue Scientifique*, and the direction of the well-known Breguet optical and horological workshop.

THERE is now at Gresham College, in Basinghall Street, an interesting collection of objects which have been sent over from the Technical School at Iserlohn, in Westphalia. They comprise examples in wax, plaster, wood, and metal, the works executed by students in the special trade-school which was founded by the Prussian Government, and which is said to have rendered important service to the manufactures of the district. The collection has been sent over in response to the application of Mr. Philip Magnus, one of the Royal Commissioners on Technical Education, and inspection will be permitted on application to that gentleman during this week.

By last advices from Manila (May 17), according to the *London and China Telegraph*, two German naturalists, Messrs.

Schadenburg and Koch, had just arrived there from Mindanao, where they had recently successfully ascended a volcano called Apo, the highest mountain in the Philippines, a feat only once before achieved by Europeans, this being in October, 1880. After several vain attempts, Senor Rajal, in 1880, a few months after assuming the governorship of the district, determined to ascend the volcano, notwithstanding the opposition of the Bagobo savages, who assured him that a human sacrifice was essential for success. His influence over them was, however, so great that he prevailed on fifty of the savages to accompany him as guides and porters, and was thus enabled to set out on the expedition in October that year with several Spaniards and Dr. Montano, a French naturalist. The ascent proved so dangerous and difficult that only Dr. Montano and Senor Martinez reached the top on the north-east side of the volcano, its height being determined by them at 3130 metres above the sea. The safe return of this expedition after nine days' absence without the human sacrifice required by the savages resulted in lessening their superstitious dread of the Apo. The *Diario* states that Messrs. Koch and Schadenburg made two ascents of the Apo in February and March last, under the guidance of several savages, during which they ascertained the height of its south-west peak to be 3000 metres (10,824 Eng. feet) above sea level.

IN the July number of the *American Naturalist* is a paper of much value by Mr. Ivan Petroff on the Limit of the Innuits Tribes on the Alaska Coast, in which the writer combats some of the conclusions come to by Mr. Dall. Mr. Petroff has been familiar for years with these coasts, and his conjectures as to the origin and migration of the Innuits and other tribes will interest ethnologists. In this connection Mr. Petroff has some important observations on the rate of accumulation of shell-heaps. He says:—"The time required for the formation of a so-called layer of 'kitchen refuse' found under the sites of Aleutian or Innuits dwellings, I am inclined to think less than indicated by Mr. Dall's calculations. Anybody who has watched a healthy Innuits family in the process of making a meal on the luscious echinus or sea urchin, would naturally imagine that in the course of a month they might pile up a great quantity of spinous *débris*. Both hands are kept busy conveying the sea fruit to the capacious mouth; with a skilful combined action of teeth and tongue, the shell is cracked, the rich contents extracted, and the former falls rattling to the ground in a continuous shower of fragments until the meal is concluded. A family of three or four adults, and perhaps an equal number of children, will leave behind them a shell monument of their voracity a foot or eighteen inches in height after a single meal. In localities in Prince William Sound I had an opportunity to examine the camp-sites of sea-otter hunters on the coast contiguous to their hunting-grounds. Here they live almost exclusively upon echinus, clams, and mussels, which are consumed raw in order to avoid building fires and making smoke, and thereby driving the sensitive sea-otter from the vicinity. The heaps of refuse created under such circumstances during a single season were truly astonishing in size. They will surely mislead the ingenious calculator of the antiquities of shell heaps a thousand years hence."

IN the same article Mr. Petroff has also some interesting observations on the action of tides on the coast:—"As an instance of the rapidity with which the tides of this region will change outlines of coast and other land marks, I may cite an observation made by me during my stay on Nuchek island last summer. At a short distance from the settlement there was a cave in a rocky cliff situated about three or four feet above high water mark. visited the place frequently, as it afforded a view over the approaches to the harbour. About the middle of June an eclipse of the moon occurred when it was full or nearly so, causing tidal commotion of unusual extent and violence. When I visited my

cave on the day following the eclipse, I found it almost filled with shingles and *débris*. This cave was situated at about the same height above the water as the cave of Amaknak, from which Mr. Dall extracted such voluminous information as to the antiquity of strata of refuse found therein. I cite these instances only for the purpose of showing that it is not safe to ascribe great age to any and all accumulations of *débris* found on the coast of Alaska, and also as a support for my theory of a general Inuit migration along the coast at a comparatively recent period, subsequent to the invention of the *kaiak* or a similar structure."

FROM the Italian Census of December 31, 1881, it appears that in 23 out of 24 provincial chief towns the number of persons knowing how to read and write has greatly increased since 1871. In ten years the citizens of Udine had increased in such knowledge at the rate of 9 per cent.; in Como, 6.50 per cent. Brescia made a strange exception; in 1871 there were 2899 persons ignorant of reading and writing, and in 1881 this number was increased to 3120 persons; data are wanting to explain this fact. In the 24 capitals of provinces the average result is that a little more than 50 per cent. of the inhabitants know how to read and write.

MESSRS. TRÜBNER AND CO. have issued a second and much enlarged edition of their "Catalogue of the Principal Languages and Dialects of the World." The original catalogue contained about 1100 titles on 64 pages, while this edition enumerates nearly 3000 titles on 170 pages. The utility of such a catalogue to students of language is obvious.

WITH praiseworthy promptness Messrs. Blackie and Son have issued the third volume of the new edition of the Imperial Dictionary, edited by Mr. Charles Annandale. This volume extends from L to Scream, and in all respects is up to the two first volumes. The only omission of importance we detect is Photophone, which perhaps came too late to be put in its proper place.

A FRENCH engineer has originated a plan by means of which passing ships could send messages by submarine cables; he would float buoys with the necessary connecting wires and apparatus at intervals of a day's journey along the line of the cable, each numbered and properly lighted at night. The writer in the *Moniteur de la Flotte* considers that the plan presents but few difficulties, and would obviate much anxiety and many dangers.

DR. SCHLIEMANN is carrying on new excavations at Hissarlik, with the assistance of two eminent German architects. No fewer than 150 workmen are daily employed in laying bare the foundations of the ancient cities. Two perfectly distinct cities have lately been discovered in the burnt stratum, the lower one resting on the large walls which have hitherto by mistake been attributed to the second city. Hissarlik now turns out to have been the Acropolis of this lower burnt city, this being proved by the walls and the pottery, as well as by two vast brick buildings, one of them 43 feet broad by 100 feet long, the other 23 feet broad by less than 100 feet long. These buildings seem to have been temples, a separate gateway, flanked by enormous towers, leading up to them. There are, besides, three or four large buildings, apparently dwelling-houses, but no smaller buildings. The city walls now stand out very imposing. They rest on a substructure of large blocks, 33 feet high, afterwards superseded by great brick walls. All the treasures formerly found by Dr. Schliemann are now ascribed to the first burnt city. Dr. Schliemann has found in the temples copper nails of a very peculiar shape, weighing from 1000 to 1190 grammes. The second burnt city, being the third city from the rock, and hitherto identified with the Homeric Troy, turns out to have had but very small

houses and no lower town at all. Dr. Schliemann will continue his excavations till the beginning of August.

SOME interesting objects which have, according to the *Daily News* correspondent, just been found in Neuchâtel are considered by Swiss archaeologists to throw a new light on the history of the lake-dwellers, and the discovery is consequently looked upon as one of importance. Amongst the objects are a carriage-wheel with iron rim, iron swords, and many human bones.

THE *Field Naturalist* is the name of a new natural history journal, published by A. Heywood of Manchester; it is stated to be "a medium of intercommunication," and for this purpose it will doubtless be of service to the many cultivators of science throughout the country.

THE *Proceedings* of the Liverpool Naturalists' Field Club for 1881-82, gives the usual account of the numerous excursions of this Society; they seem to have been successful. We have also received an interesting brief Report of the work done by the York School Natural History Society during the past year; this Society has founded a special section, exclusively devoted to scientific workers.

THE additions to the Zoological Society's Gardens during the past week include a Red-legged Partridge (*Caccabis rufa*), European, presented by Dr. A. O. Grosvenor; a Ring Ouzel (*Turdus torquatus*), British, presented by Mr. H. A. Macpherson; a Red-sided Eclectus (*Eclectus polychlorus*) from New Guinea, presented by Mr. A. Lubbock; a Horned Lizard (*Phrynosoma cornutum*) from Texas, presented by Master Charles Ed. Napier; a Dwarf Chameleon (*Chamaleo pumilus*), eighteen Rough-scaled Lizards (*Zonurus cordylus*), a Banded Skink (*Euprepes vittatus*), a South African Skink (*Scelotes bipes*), four Beetles (*Scarites rugosus*), four Beetles (*Psorodes*, sp. inc.) from Robben Island, South Africa, presented by the Rev. G. H. R. Fiske, C.M.Z.S.; a Goshawk (*Astur palumbarius*), European, deposited; two Black Leopards (*Felis pardus*), an African Elephant (*Elephas africanus* ♂) from Africa, a Hardwick's Hemigale (*Hemigale hardwicki*) from Borneo, a Cuvier's Lagotis (*Lagotis cuvieri*) from Patagonia, a Pronghorn Antelope (*Antilocapra americana*) from North America, a Malayan Tapir (*Tapirus indicus*), two — Hornbills (*Buceros*, sp. inc.) from Malacca, purchased; a One-Wattled Cassowary (*Casuarus uniappendiculatus*) from New Guinea, received in exchange; three Chiloe Wigeons (*Mareca chilensis*), bred in the Gardens.—The following insects have emerged during the week:—Silk Moths: *Actias selene*, *Telea polyphemus*; Butterflies: *Parnassius apollo*, *Vanessa polychlorus*, *Thecla spini*, *Melanargia galathea*; Moths: *Deilephila euphorbiae*, *Sciapteron tabaniformis*, *Bembecia hyleiformis*, *Zygena filipendule*, *Plusia concha*.

PROF. MENDELEEF ON THE HEAT OF COMBUSTION OF HYDROCARBONS¹

"IN considering the numerical data as to the heat of combustion," Prof. Mendeleeff says, "it will be perceived that until now sufficient attention has not been given to the distinction between purely calorimetrical data and those physical and mechanical changes which accompany chemical reactions, while it was recognised long ago that it is essential to separate, as far as possible, the heat of the reaction from the heat disengaged by physico-mechanical processes. The drawback arising from this is especially noticeable with regard to the heat of combustion of compounds of carbon, as this heat is used for measuring the heat of formation of compounds of carbon from simple bodies, which last is, as is known, but a small fraction of all the heat of combustion." Thus, for example, when the products of combustion of CO₂ and of H₂O act on incandescent charcoal, both reactions are very similar, if we do not give attention to the physical process which accompanies the second reaction. The

¹ "Notice on the Heat of Combustion of Hydrocarbons," in the *Journal of the Russian Chemical and Physical Society*, vol. xiv. pp. 230-238.